SUBMIT TO: SD 97
INSTRUMENTS, METHODS AND MISSIONS FOR INVESTIGATION OF EXTRATERRESTRIAL MICROORGANISMS. Chair: Richard Hoover, NASA Marshall Space Flight Center

SEARCHING FOR OCEANIC OCEANOGENY (ACTIVITY ON EUROPA ANI ) EARTH

Joan Horvath
Jet Propulsion Laboratory, California Institute of Technology
4800 Oak Grove Drive, Pasadena CA 91109
Voice: 818-354-7431 Fax: 818-393-1366 Email: joan.c.horvath@jpl.nasa.gov

Frank Carsey
Jet Propulsion Laboratory, California Institute of Technology
4800 Oak Grove Drive, Pasadena CA 91109
Voice: 818-354-8163 Fax: 818-393-6720 Email: fdc@pacific.jpl.nasa.gov

Jack Jones
Jet Propulsion Laboratory, California Institute of Technology
4800 Oak Grove Drive, Pasadena CA 91109
Voice: 818-354-0471 Fax 818-354-0586 Email: jack.jones@jpl.nasa.gov

Elizabeth Johnson
Jet Propulsion Laboratory, California Institute of Technology
4800 Oak Grove Drive, Pasadena CA 91109
Voice: 818-354-4926 Fax: 818-393-1366 Email: liz@paddy.jpl.nasa.gov

Julian Chela-Flores
International Centre for Theoretical Physics
Office 275, P.O.Box 586;Strada Costiera 11;34136 Trieste, Italy.
Voice: (int. 439 40) 2240392 Fax: (int. 439 40) 224163
Email: chelaf@ictp.trieste.it

Kenneth Jezek
Byrd Polar Research Center, Ohio State University
1090 Carmack Rd., Columbus OH 43210-1002
Voice: 614-292-6531 Fax. 614-292-4697
Email: jezek@iceberg.mps.ohio-state.edu

Tzuyu-Wen Jeng
Abbott Diagnostics Division, Abbott Laboratories
Abbott Park, IL 60064
Voice: 847-938-8904 Fax: 847-938-7812
Email: jengt.ad@notes.abbott.com

Albert Bradley
Woods Hole Oceanographic Institution
Woods Hole, MA 02543
Voice: (508) 548-3400 Email: abradley@whoi.edu

James Cutts
Jet Propulsion Laboratory, California Institute of Technology
4800 Oak Grove Drive, Pasadena CA 91109
Voice: 818-354-4120 Fax: 818-354-8333 Email: james.a.cutts@jpl.nasa.gov
PRESENTATION PREFERENCE: POSTER

ABSTRACT:

One of the more likely places in the solar system for the existence of extraterrestrial life forms is the Jovian moon Europa. It has been postulated that a volcanically-heated ocean exists underneath Europa's icy surface. After a detailed remote-sensing reconnaissance is made of Europa and it is determined that an ocean does exist under the ice, in-situ measurements will be needed to directly explore the Europian ocean and the ice that lies above it.

In order to make quantitative measurements of the Europian environment, a lander spacecraft capable of penetrating the surface ice layer by melting through it is proposed. This vehicle, dubbed a "cryobot", will be designed to carry a small deployable submersible (a "hydrobot") equipped with a complement of instruments. The cryobot has heritage in terrestrial ice exploration "Philbot" mutter probes, and the hydrobot will draw on autonomous submersible experience in the oceanic community.

This paper will describe a strawman design of this mission. We will particularly focus on instrumentation requirements for such a pair of exploratory vehicles. The design of an instrument package to search for life across the wide range of thermal and pressure environments expected on Europa, the issues in sample handling, and long-term reliability for a potential multi-year transit through the ice all present difficult design issues. Finally, we will discuss opportunities for performing high-value science on earth to test these instruments, and cover synergistic relationships with the pharmaceutical industry and others in the design and deployment of these instruments.

KEYWORDS:
Europa, exobiology, instrumentation, submersibles, ice probes

FIRST AUTHOR:

Joan Borvath holds a joint appointment between the Technology Transfer and Commercialization Program Office and the Advanced Concepts Program at JPL. Previously she held positions on the TOPEX, Magellan, and Cassini missions. She received a BS in Aeronautics and Astronautics from MIT, and an MS in Mechanical, Aerospace, and Nuclear Engineering from UCLA.